

Applicant: Vesa Ahvenniemi et al.
Application No.: 10/595978
Response to Office action mailed Oct. 5, 2010
Response filed October 25, 2010

Claim Listing

1–12. (canceled)

13–17. (canceled)

18. (currently amended) An arrangement for tail threading in a web-forming machine, comprising:

- a plurality of sequential production sections;

- a first production section of the plurality of sequential production sections having a ~~means for cutting device which cuts~~ a threading tail from the web being formed on the web-forming machine;

- a second production section of the plurality of sequential production sections following in sequence the first production section, the second production section having a start, and a ~~means for threading device arranged to thread a threading~~ tail through the second production section, which ~~threading device means for threading forms having~~ a first draw point at the start of the second production section;

- a ~~means for transferring transfer device arranged to transfer~~ a threading tail from the first production section to the ~~means for threading device~~ of the second production section;

- wherein the second production section has an end which defines a holding point, to which the ~~means for threading device~~ extends;

- control equipment arranged in controlling connection to the ~~means for cutting device a threading tail, the means for transferring the threading tail transfer device, and the means for threading device the threading tail;~~

- a first camera device arranged for collecting time-specific image information of formation of a threading tail by ~~the cutting device means for cutting a threading tail;~~

- a second camera device arranged for collecting time-specific image information of a

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web tail in the transfer device ~~the means for transferring a threading tail~~ at the first draw point;

a third camera device arranged for collecting time-specific image information of the holding point; and

memory devices connected in image storing relation to the first camera device, the second camera device, and the third camera device for storing time-specific image information collected using the first camera device, the second camera device and the third camera device, the memory devices connected to a display device such that images captured by the first camera device, the second camera device and the third camera device can be displayed in a selected manner.

19. (previously presented) The apparatus of claim 18 further comprising a fourth camera device arranged for collecting time-specific image information of a selected point in the plurality of sequential production sections, the fourth camera device connected in time-specific image information supplying relation to the memory devices, the memory devices connected to the display device such that images captured by the fourth camera device can be displayed in a selected manner.

20. (previously presented) The apparatus of claim 19, wherein the memory devices are connected to the control equipment so as to combine the properties of the production section of the web-forming machine and the image information.

21. (previously presented) The apparatus of claim 18, wherein the first camera device, the second camera device, and the third camera device are connected to the memory devices arranged as a single system which stores the time-specific image information of each of the first camera device, the second camera device, and the third camera device, so that such time-specific image information can be processed and examined during or after a tail threading of each sequential production section.

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22. (previously presented) The apparatus of claim 18, wherein each of the first camera device, the second camera device, and the third camera is a digital high-speed camera.

23–26. (canceled)

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27. (currently amended) A method of tail threading in a web-forming machine of a selected geometry and a selected web speed therethrough; the method comprising the steps of:

forming a threading tail from a web;

imaging to form first images the formation of the threading tail with a first camera and storing with a time reference said first images, the first camera recording a tail threading start time and each time at which a change takes place in the first images;

transferring the tail to a production section of the web-forming machine, the production section having a start and an end, the transferring taking place at a draw point which is at the start of the production section;

imaging to form second images with a camera the transfer of the threading tail to the draw point at the start of the production section and storing with a time reference said second images, the second camera recording the tail threading start time and each time at which a change takes place in the second images;

pulling the threading tail toward a holding point at the end of the production section;

imaging to form third images of the holding point and its environment and storing with a time reference said third images, the third camera recording the tail threading start time and each time at which a change takes place in the third images;

determining a time line of locations of the threading tail as a function of time based on the selected geometry and the selected speed of progress through the web-forming machine;

determining a location of a problem point by detecting a time of slacking of the tail at the draw point in the images from the second camera; and

using the time line to calculate the problem point location.

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28. (previously presented) The method of Claim 27, wherein an additional selected point of the production section of the web-forming machine is imaged.